GEOLOGY 494 Independent Study (2 cr) – Fundamentals of Hydrogeology
Version 1, Jan 13, 2021

Time:	W, 11:00 am – 1:00 pm or as arranged, Spring 2021
Instructor:	B. Saini-Eidukat, office 127 Stevens Hall, tel 701-231-8785
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Office hours:	As arranged
Texts:	"Applied Hydrogeology" by C. W. Fetter, 4th ed.
	"Groundwater" by Freeze and Cherry, 1979, online
	http://hydrogeologistswithoutborders.org/wordpress/1979-english/
Course Materials:	in Blackboard

This is a Fundamentals course in Hydrogeology. We'll cover basic concepts so you'll be conversant with them. The broad goal is to understand relationships between geologic materials and water flow. We will discuss aquifer properties, testing methods, ground water flow, and flow modeling.

Sometimes we'll meet in person, but other times we'll meet over video, and I may make recordings. We will take advantage of excellent video resources already available on the internet. We'll do more paper and report reading than a typical lecture class would. A goal will be to learn to use modeling software. There will likely be a term project on a subject of your choice.

Proposed Topics

Introduction; Evapotranspiration, Precipitation, Runoff	(Chap. 1,2)
Water Balance; Hydrologic Budgets	(2.12 and 11.3)
Soil Moisture and Infiltration	(2.8)
Aquifer Material Properties; Darcy Flow	(3.1 - 3.5; 4.6)
Non-Darcian Flow; Aquifer Properties	(3.6 - 3.9)
Aquifer Parameters	(3.10 - 3.12)
Principles of Groundwater Flow	(4.1 - 4.6)
Ground Water Flow Equations; Head	(4.7 - 4.9)
Flow Nets; Flow Lines	(4.10 - 4.12)
Steady Flow	(4.7.1; 4.13-4.14)
Regional Flow Systems	(7.1 – 7.5)
Ground Water - Surface Water Interaction	(7.7)
Geology of Ground Water	(8.1 - 8.3.1)
Well Hydraulics	(5.1 - 5.3)
Aquifer Performance Tests	(5.4 - 5.9)
Ground Water Flow Models	(13.1 – 13.7)
Hydrologic Field Investigation	(12)
Drilling	(10.4)
Mass Transport in Porous Media	(10.6)
Wellhead Protection Zones	(10.4; 10.10)
Local Case Studies	
Management of Water	(11)

Grading

Readings and Discussion:	50%
Homework:	25%
Term Project:	25%

The final letter grade will be assigned based on the following table.

A = 90-100; B = 80-89; C = 70 - 79; D = 60-69; F = <60

Academic Responsibility: The policy applied is that of the Code of Academic Responsibility and Conduct, as outlined in the current "Code of Student Conduct."

Special Needs: Any students who require special accommodations for learning or who have special needs should share those concerns or requests with the instructor as soon as possible.

Intended Student Outcomes:

- To understand the concepts describing the flow of water through geologic materials.
- To be familiar with hydrogeologic calculation methods.
- To prepare a report on a hydrogeologic issue and to present the results to an audience.

This document subject to change